Register No.: ....   Name : ....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SIXTH SEMESTER B.TECH DEGREE EXAMINATION (R), MAY 2023
CIVIL ENGINEERING
(2020 SCHEME)

Course Code : 20CET308

Course Name : Comprehensive Course Work

Max. Marks : 50   **Duration : 75 Minutes**

PART A
(Answer all questions. Each question carries 1 mark)

1   Along the principal plane subjected to maximum principal stress
- **A.** Maximum shear stress acts
- **B.** Minimum shear stress acts
- **C.** No shear stress acts
- **D.** None of these

2   For pure shear conditions on a 2D element, the normal stress is _____ when θ is between 0° to 90°
- **A.** Tensile
- **B.** Compressive
- **C.** Zero
- **D.** Maximum

3   Modulus of rigidity is
- **A.** Tensile stress / Tensile strain
- **B.** Tensile stress / Shear strain
- **C.** Shear stress / Shear strain
- **D.** Shear stress / Tensile strain

4   Shear force in a beam is
- **A.** Parallel to the length
- **B.** Neither parallel nor perpendicular to the length
- **C.** Perpendicular to the length
- **D.** None

5   The shear force at midpoint of a cantilever of length L carrying a concentrated load W at the free end
- **A.** ½ WL
- **B.** WL
- **C.** ½ W
- **D.** W

6   The bending moment at the end supports of a beam of length L, simply supported at the ends, carrying a concentrated load W at its mid span is
- **A.** 4WL
- **B.** WL
- **C.** ¼ WL
- **D.** Zero

7   For critical depth of flow of water in open channels, the specific energy must be
- **A.** minimum
- **B.** maximum
- **C.** Average of minimum and maximum
- **D.** None of these

8   The ratio of specific weight of a liquid to the specific weight of the pure water at a standard temperature is called
- **A.** Density of the Liquid
- **B.** Specific Gravity of the Liquid
- **C.** Compressibility of the Liquid
- **D.** Surface Tension of the Liquid

9   When the flow in an open channel is gradually varied, the flow is said to be
- **A.** Steady uniform flow
- **B.** Unsteady uniform flow
- **C.** Steady non-uniform flow
- **D.** Unsteady non-uniform flow

10   At sea level under normal conditions, the atmospheric pressure is 10.3 m of water and its equivalent to height of mercury is used will be
- **A.** 7.6 M
- **B.** 76 cm
- **C.** 1.03 m
- **D.** 7.6 cm

11 The main assumption of Bernoulli's equation is
   A. The velocity of liquid particle, across any cross-section of a pipe is uniform
   B. No external force except the gravity acts on the liquid
   C. There is no loss of energy of the liquid while flowing
   D. All of the above

12 Froude number is defined as the ratio of
   A. Gravity force and inertia force
   B. Inertia force and pressure force
   C. Inertia force and gravity force
   D. Gravity force and pressure force

13 In an ideal transition curve, the radius of curvature
   A. Is constant
   B. At any point is directly proportional to its distance from the point of commencement
   C. Is inversely proportional to the radius of main curve
   D. Is directly proportional to the radius of main curve

14 The ideal shape of a transition curve, is
   A. Clothoid
   B. Cubic spiral
   C. Cubic parabola
   D. Lamniscate

15 Thickness of a pavement may be reduced considerably by
   A. Compaction of soil
   B. Stabilisation of soil
   C. Drainage of soil
   D. Combination of all the above

16 The very first reading taken in a levelling operation is called
   A. Back sight
   B. Fore sight
   C. Intermediate sight
   D. Inverse

17 The type of transition curves generally provided on hill roads, is
   A. Circular
   B. Cubic parabola
   C. Lemniscate
   D. Spiral

18 For a vehicle moving with a speed of 80 km per hour, the brake reaction time, in ordinary cases is
   A. 1 sec
   B. 1.5 sec
   C. 2 sec
   D. 2.5 sec

19 Honey combed structure is found in:
   A. Gravels
   B. Coarse sands
   C. Fine sands and silts
   D. Clay

20 In case the soil mass's plasticity index is zero, then the soil would be:
   A. Clay
   B. Sand
   C. Silt
   D. All of above

21 According to IS classification system, the soils can be classified into:
   A. 15 groups
   B. 18 groups
   C. 3 groups
   D. 7 groups

22 The permeability of soil varies:
   A. Inversely as square of grain size
   B. As square of grain size
   C. As grain size
   D. Inversely as void ratio

23 Darcy's law of linear dependency is valid for _____ flow.
   A. laminar and turbulent
   B. laminar
   C. Turbulent
   D. intermediate

24 IS classifications of soil is in many cases similar to:
   A. AASHTO classification
   B. Textural classification
   C. Unified soil classification
   D. MIT classification

25 Varnish is a transparent or semi-transparent solution of resinous substances in
    A. Alcohol   **B.** Linseed
    C. Turpentine   **D.** All the above

26 The portion of the brick without a triangular corner equal to half the width and half the length, is called
    A. Closer   **B.** King closer
    C. Queen closer   **D.** Bat

27 A badly mixed cement concrete results in
    A. Segregation   **B.** Bleeding
    C. Honey combing   **D.** None of the above

28 Enamel paint is made by adding
    A. White lead in varnish   **B.** Bitumen in varnish
    C. White lead in lacquer   **D.** Zinc white in spirit

29 Soundness test of cement is done using
    A. Le Chatelier's apparatus   **B.** Vicat Apparatus
    C. Tubidimeter   **D.** Briquette

30 The commonly used colour pigment in paints, is
    A. Ambers   **B.** Carbon black
    C. Iron oxide   **D.** All the above

PART B
(Answer all questions. Each question carries 2 marks)

31 An axially loaded bar is subjected to a normal stress of 173 MPa. The shear stress in the bar is
    A. 75 MPa   **B.** 86.5 MPa
    C. 100 MPa   **D.** 122.3 MPa

32 The ratio of maximum bending stress to maximum shear stress on the cross section when a shaft is simultaneously subjected to a torque T and bending moment M,
    A. T/M   **B.** M/T
    C. 2T/M   **D.** 2M/T

33 In a stream line steady flow, two points A and B on a stream line are 1 m apart and the flow velocity vary uniformly from 2m/s to 5 m/s. What is the acceleration of fluid at B
    (in m/s^2)?
    A. 3   **B.** 6
    C. 9   **D.** 15

34 The Reynold's number for pipe flow is given by
    A. $\rho VD/\mu$ **B.** $VD\mu/\delta$
    C. VD/υ **D.** VD/μ

35 The reduced bearing of a line is N 87°W. Its whole circle bearing is
    A. 87°   **B.** 3°
    C. 93°   **D.** 273°

36 In the quadrantal bearing system, a whole circle bearing of 293º30' can be expressed as
    A. W 23º30' N   **B.** N 66º30' W
    C. S 113º30' W   **D.** N 23º30' W

37   The weight of a pycnometer containing 400 g sand and water full to the top is 2150 g. The weight of pycnometer full of clean water is 1950 g. If specific gravity of the soil is 2.5, the water content is

A.   **B.**   10%
   5%
C.   15%   **D.**   20%

38   A fully saturated clay specimen is subjected to a pressure of 200kN/m² in the consolidation test. After a period of time when the average pore pressure is 60kN/m², the degree of consolidation is:

A.   60   **B.**   70
C.   30   **D.**   50

39   The failure criteria used for reinforced concrete beams and columns in limit state method is based on

A.   Maximum principal stress theory   **B.**   Maximum principal strain theory
C.   Maximum shear stress theory   **D.**   Maximum distortion strain energy theory

40   The first stage of a construction, is

A.   preparation of estimate   **B.**   survey of the site
C.   initiation of proposal   **D.**   preparation of tender